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IN SERVICE TRAINING IN COMPUTER ASSISTED INSTRUCTION FOR VOCATIONAL TEACHERS. FINAL REPORT.

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DESCRIPTORS- *COMPUTER ASSISTED INSTRUCTION, *CURRICULUM DEVELOPMENT, COURSE CONTENT, *VOCATIONAL EDUCATION, *PROGRAMING PROBLEMS, *TEACHER EDUCATION,

THIRTEEN TEACHERS USED COMPUTER ASSISTED INSTRUCTION TO WRITE AND STORE THEIR OWN PROGRAMS OF COURSE WORK IN VOCATIONAL EDUCATION. ALTHOUGH TECHNICAL DIFFICULTIES AND TIME DELAYS WERE ENCOUNTERED, IT WAS CONCLUDED THAT MOST OF THE TEACHERS BENEFITTED FROM THIS INTRODUCTION TO COMPUTER ASSISTED INSTRUCTION. (LH)

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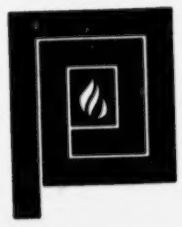
COMPUTER ASSISTED INSTRUCTION



PROVIDENCE COLLEGE COMPUTER CENTER

U. S. OFFICE OF EDUCATION

CONTRACT

OE - 7 - 062811 - 0016

Final Report

Project No. 6-2811

TITLE:	"In Service Training in Computer Assisted Instruction for Vocational Teachers."
AUTHOR:	Robert R. Reynolds
INVESTIGATOR:	G. C. McGregor, O.P.
GRANT NUMBER:	OEG1-7-062811-0016 Vocational Education Act of 1963, P. L. 88-210, Sec 4 (c)
GRANTEE INSTITUTION:	Providence College Providence, Rhode Island
DATE:	July 13, 1966--October 15, 1966

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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EM006 039

SUMMARY OF PROJECT NO. 6-2811

GRANT NUMBER: OEG1-7-062811-0016

TITLE: "In Service Training in Computer Assisted Instruction for Vocational Teachers."

INVESTIGATOR: G. C. McGregor, O. P.

INSTITUTION: Providence College
Providence, Rhode Island

DURATION: July 13, 1966--October 15, 1966

PURPOSE: The purpose of this project was to allow the participants to revise, rewrite, and evaluate course material in hopes of producing one unit or semester of work in Computer Assisted Instruction mode.

PROCEDURE: Formal instruction in the use of the Coursewriter Language and discussion periods were conducted four evenings per week, for two hours each evening. Each participant was required to attend these sessions. At his convenience, each participant was required to schedule two hours of computer time to be used to test stored materials and revise or enter new course data. Any procedural difficulties encountered during the entry or testing of material were discussed at the evening sessions. Many of the recommendations and guidelines for future programs resulted from these discussion periods.

RESULTS AND CONCLUSIONS:

This project was the third phase in a proposed five phase project which was hoped to result in a vocational education curriculum for junior and senior high school students. The third phase was designed to produce course material which would be used to test student progress, or the lack thereof, when instruction was presented in Computer Assisted Instruction mode. Although we realize that the scope of our objective, to produce one semester of work, was too broad to be wholly achieved, we feel that several participants have made significant progress in realizing the spirit of this objective. (See Appendix 1.)

1. Each participant entered some portion of his program.

2. Most participants wrote and planned material in excess of the amount he was able to enter.

3. Additional experience gave rise to a good deal of revision and expansion of previously entered material.

4. Many participants assisted each other by acting in the role of students to test previously entered material. This brought to light problems in the selection of wording in both directions and text material, in formating of text material, and in the need for expanded use of functions.

5. Several visitors to the computer center were allowed to try course material and were enthusiastic about the potential of CAI. (See Appendix 2.)

6. Provision has been made in many programs for the use of the tape recorder and slide projector features of our system.

7. Each participant developed a high degree of proficiency in the following CAI skills:

   a. Initializing the system.
   b. Inserting and deleting course material.
   c. Polling the units of the system.
   d. Functioning in the role of the author, student, and the proctor.

8. Many participants continued working on their programs well beyond the six week workshop period. Several continued through the Labor Day weekend.

The process of learning to write effective programs in Computer Assisted Instruction mode is a very slow process. Continual revision is necessary as an author reaches new plateaus of understanding and proficiency revealing inadequacies of the past. The author must assume an active and self-directing role. His best support is the stimulation provided by the company of others similarily engaged in CAI.

The amount of time and effort expended by the participants in this project attest to the ability of CAI to capture the imagination and to provide a continuing motivating force, despite failures of equipment and frustration of constant revision of materials. It is our belief that the enthusiastic reception by the participants and visitors, who have been able to be engaged in CAI, indicates the future effectiveness of the computer in education.

It is the belief of the participants that the discipline imposed by their individual CAI projects--being com-

pelled to view a curriculum as a detailed, preplanned entity--has produced a heightened appreciation of the learning process and improved their effectiveness as teachers.

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STATEMENT OF PURPOSE

The purpose of this project covering the period of July 13, 1966 to October 15, 1966 was to test and evaluate course sectors leading to the development of one semester courses which would be used in establishing a Computer Assisted Instruction Curriculum in vocational education for junior and senior high school students.

GENERAL OBJECTIVES

1. To test and evaluate course material.
2. To revise and expand previously written material.
3. To develop proficiency in the use of the Computer Assisted Instruction system as a proctor, an author, and as a student.
4. To develop a better appreciation in the problems of developing a curriculum in Computer Assisted Instruction mode.

SPECIFIC OBJECTIVES

1. Each participant was to complete the writing of one unit or semester of material in his particular course area.

2. Each participant was to enter as much of his course material as possible on the disk storage unit.

3. Each participant would select two high school students to test his course material.

4. Each participant would utilize the record of student responses to evaluate his course material.

DESCRIPTION OF PROJECT

The project was directed by the Rev. G. C. McGregor, O.P. and supervised and coordinated by Mr. Paul Bartolomeo. Workshop periods were conducted on Monday through Thursday from 7:00 to 9:00 PM July 5 to August 12, 1966. These evening sessions were conducted in the workshop style, except that two hours was reserved for formal instruction in the Coursewriter language. Due to the fact that only two terminals were available, participants were required to schedule two hours of computer time outside of the normal class hours to enter and test their course material.

One hour of each evening session was devoted to the accomplishment of our general objectives of developing proficiency in role of the author, proctor and student on the system. The remaining hour was used for discussion, conferences with the instructor, working alone, or observation of other participants utilizing the system.

About August 1, 1966, a new method of entering course material into storage was made available by the University of Texas. This method enabled the participants to write their course material on coding sheets and to have this material punched into cards. However, our equipment would not accept this method and IBM technicians had to be called upon to make necessary adjustments. Unfortunately, this work could not be completed before the end of the workshop period. We did begin formal instruction in the use of the coding sheets so that as soon as the system was adjusted, course material could be entered by this media.

Each participant was evaluated by the director and coordinator of the project. Quality of written material, degree of professional improvement, proficiency in use of the equipment, and demonstration of interest as evidenced by independent pursuit of learning, extra hours of work, superior degree of workshop participation, and attitude were considered in obtaining the participant's final grade.

STUDENT SELECTION

The thirteen vocational education teachers who participated in this project are the same participants who took part in earlier phases of this project under U. S. Office of Education contracts OE-5-85-105 and OE-6-85-093. All members of this group were selected on the basis of their scores on the IBM Programmers Aptitude Test. The names of the participants will be found in Appendix V.

PROJECT EVALUATION

The project was not free from technical difficulties inherent in experimental situations. Repeated equipment failure shut down the system many days and snarled input. Some logic difficulties in the Coursewriter language were encountered. Disks damaged in transit required re-entering. As a result, the entering and testing of course sectors fell well behind schedule. This caused problems in motivation for the authors. A more detailed explanation of the technical difficulties may be found in Appendix 8.

The stated objective of completing a semester's course appears to have been too ambitious. As the work progresses, there is an increasing realization that a great deal of time is required to produce a CAI course approaching professional quality. Anywhere from 50 to 150 hours is required to produce a forty minute lesson. Much of this time is taken up in revising, rewriting, and re-entering data in addition to writing and entering new material. Many of the participants worked well beyond the grant period, several right through Labor Day weekend.

The manner in which classes were conducted seems to have achieved the kind of atmosphere that was desired. Teachers were able to pursue that which was of immediate concern to them. They shared their experience by giving others their perspectives and opinions. Programming problems were solved with individual guidance from the instructor. Extemporaneous group or class discussions delved into matters of common concern. It is felt that more formal methods tend to discourage individual involvement, discovery, and creativity, and to distort specialized subject matter into stereotyped and inappropriate patterns.

We feel that the following results have been achieved:

1. Each participant entered some portion of his program.

2. Most participants wrote and planned material in excess of the amount he was able to enter.

3. Additional experience gave rise to a good deal of revision and expansion of previously entered material.

4. Many participants assisted each other by acting in the role of students to test previously entered material. This brought to light problems in the selection of wording in both directions and text material, in formatting of text material, and in the need for expanded use of functions.

5. Several visitors to the computer center were allowed to try course material and were enthusiastic about the potential of CAI. (See Appendix 2.)

6. Provision has been made in many programs for the use of the tape recorder and slide projector features of our system.

7. Each participant developed a high degree of proficiency in the following CAI skills:

   a. Initializing the system.
   b. Inserting and deleting course material.
   c. Polling the units of the system.
   d. Functioning in the role of the author, student, and the proctor.

8. Many participants continued working on their programs well beyond the six-week workshop period. Several continued through the Labor Day weekend.

9. Each participant has become familiar with the new punch card method of inputing course material.

We definitely believe that the batch-load method, punch card method, of inputing course material offers tremendous advantages over the entering of material through the 1050 Communications Terminal. As stated in our report, under U. S. Office of Education Contract OE-6-85-093, the 1050 Communications Terminal is not an efficient method of input unless the author has the ability to type. No consideration was given to the participants' typing ability as a prerequisite to admission to the project. Although the necessary adjustments needed to adapt our equipment to accept the batch-load method were not completed before the end of the grant period, many participants had begun to write course material for entry by this method.

CONCLUSIONS

The project has satisfied most of the general and specific objectives stated in this report. We do feel that the objectives of producing a full semester of work and a vocational education curriculum are much too ambitious for a project of this nature. 50 to 150 hours of work are required to produce one 40-minute class lesson. Considering the participants spent 15 hours in preparation each week, outside of the required attendance, in six weeks, only one to one and one half class lessons could have been prepared. This would be far less than that required for one semester let alone a full curriculum.

The most important single impediment in preventing this project from progressing at a higher rate of efficiency was the lack of reliability of our CAI equipment. Most participants wrote far more material than could be entered. Yet, even the data which was entered was, in several instances, destroyed by equipment malfunction. The idea of presenting demonstrations for high ranking school administrators was approached cautiously for fear of adverse reaction due to the unreliability of the equipment. Several authors experienced so much difficulty, they would not bring their students to test material. Finally, we experienced a severe problem in morale among the participants themselves.

One difficulty which we have mentioned in previous reports seems to have been overcome. The development of the batch-load method of entering course material should enable the authors to enter data at a higher rate. In addition, plans have been made to store data on punched cards at periodic intervals, and on magnetic tape before each author work period. After the work period, the updated course will be entered on magnetic tape by the technical personnel to provide a back-up system. These procedures should prevent the destruction of previously entered materials, and an efficient re-entry method will be established in the event of equipment malfunction.

In spite of the problems, which are not unusual in an experimental situation, we are confident that Computer Assisted Instruction provides the most versatile teaching aid to be yet devised. The teacher is freed from the dual task of information transmission and drill. His creative talents can now be utilized to provide instruction for the gifted or exceptional students. The student is required to assume an active role at all times, and the program is tailored to allow him to progress at his own pace. This continual involvment and the immediate knowledge of success or failure should prove to be a positive motivational force.

RECOMMENDATIONS

1. A technical bulletin should be instituted as soon as possible.

2. A users group should be started among the various colleges and universities in Rhode Island which have CAI compatible equipment.

3. More realistic objectives should be established.

4. A review of present equipment should be made, especially the student terminals.

5. There should be coordination, through the U.S. Office of Education, to keep participants in various CAI projects abreast of the newest developments in the field.

6. Individual initiative should be encouraged in entering and testing materials.

7. One session a month should be utilized to document difficulties experienced by the participants with either Coursewriter or the terminal equipment.

8. Visitors should be encouraged to test CAI as soon as equipment is proven reliable.

9. An inservice program for teachers in other fields should be instituted. This could be done with or without equipment.

GUIDELINES

1. Formal instruction in the use of Coursewriter should be continued with special emphasis on the use of functions.

2. The workshop approach should be utilized.

3. All course material should be written prior to formal workshop or class sessions.

4. Authors should be required to utilize the batch-load method of entry. The 1050 terminal use should be limited to testing and minor corrections of format or logic.

5. Author logs for both time spent in preparing material and problems encountered in entering or testing data should be maintained weekly.

6. New participants should be solicited, utilizing the previous participants as instructors.

7. Outside evaluation of course material should be obtained.

8. The objective of producing a single semester of work should be maintained, but the objective of producing a vocational education curriculum in Computer Assisted Instruction mode should be dropped.

9. Future programs should make provision for typists or require the participants to be able to type.

10. Participants should be appraised as to the number of hours of commitment that will be required.

APPENDIX I

Sample course sections completed during the July to August, 1966, phase of the project in Computer Assisted Instruction.

demo1,s1100
your name is R. R. Reynolds ds1

Introduction to Data Processing

Prepared by

Mr. Robert R. Reynolds

for

Computer Assisted Instruction

Providence College

Providence, Rhode Island

1965--1966

You are about to begin a course designed to introduce you to some of the automated devices used to process data. The course is divided into three basic sections:

1. Simple devices
2. Unit Record Equipment
3. Electronic Computer

Please depress the response key [Altn coding and 5].

The objective of this section is to acquaint you with some of the simple automated devices used in the modern business world. Carbon paper is the simplest automated device. The impression of the original is transferred to a copy by the carbon automatically.

Sensitized paper, developed by the National Cash Register Company, is our next simple device. This paper is treated with chemicals. Original impressions are transferred automatically to the copies without the smudging or mess of carbon paper.

Our next device is familiar to most people. Credit cards, charge account plates, name and address plates, etc., are forms of the embossed plate. Embossed plates are made of plastic or metal. Data on the plate is raised or embossed. Carbon paper or an inked ribbon is placed between the document and the plate. Pressure is applied by a roller, and the data is transferred.

Please key an eob [altn coding and 5].

Indicate your answers by using the LETTER ONLY.
Which of the following is the simplest form of automated device used in today's business office?

[a] Embossed plate
[b] Sensitized paper
[c] Punched card
[d] Carbon paper

b
b - not accepted
Incorrect. Try again.
a
a - not accepted
Incorrect. Did you follow the directions carefully? Try again.

d
Very good. Let's go on.
Paper that has been treated wish chemicals and is used to make copies of an original document is called:

[a] Carbon paper
[b] Inked paper
[c] Sensitized paper
[d] Copy paper

c
Very good.
The impression of an ------ ------ is made by means of a pressure roller and carbon paper or inked ribbon.

[a] Embossed plate
[b] Identification cards
[c] Invoice
[d] Order

a
Fine. Now you are ready to go on to the next assignment.
Another simple automated device is the pegboard. A pegboard is a flat writing surface with numbered pegs or posts along one side. Forms are punched with holes to match the pegs for alignment.
Look at the first illustration. When you are ready to go on, key an eob [altn coding and 5].

Data is transferred from one form to another by carbon or sensitized paper. The master list is placed on the pegboard first. Then the carbon paper is placed on top. Each additional form is then placed on top. The original is the last to be set on the pegboard. All forms to be used must be coordinated.
Each original is aligned to the pegs in descending order. As our illustration demonstrates, each check would be placed on the pegboard a bit lower than the one before it. When we are finished, we will have a master list or listing without having to copy the data from the original several times.
Please key an eob.

//ss002x//
Indicate your answer by typing the word or words that identify your selection.
A flat writing surface with numbered pegs along one edge is known as a --------.
pegboard
Data on the original is transferred to a copy or master list by means of -------.
carbon paper
Forms are aligned or lined up by using the numbered ----- along the edge of the board.
pegs
That's it, You are doing well. Keep it up.
The advantage of using a pegboard is that we may have a copy or a ----- without having to rewrite the data on the original document.
mastr list
Forms used with the pegboard are aligned with the pegs on the board by means of------on the edge of the form.
holes
Fine. Your answer is correct. Let's try the next section.
Our final simple device is a bit more complex than the others. The Keysort Process uses a card with holes punched on the edges of the card.
Please turn to the second illustration.

Information is recorded on the card by notching the holes. These holes may be grouped together to represent data. Holes grouped in this manner are called code fields. The number of holes in each group may vary to meet the needs of the user. A code known as the binary code is used to represent data. Only numeric data may be recorded.
When you are ready to go on, please key an eob.

Inorder to sort or select data from the cards, we pass a steel rod or needle through the holes in the edge of a deck of cards. The cards that have been notched will fall from the needle, and the unnotched cards will remain on the needle. This procedure will be followed for each position in the code field. Once data has been recorded manually into the cards, the sorting or selection of data is automatic.
Please key an eob.

Supply only the LETTER that indicates your answer.
The fields on a keysort card are:
[a] on the top
[b] on the edge
[c] in the middle
[d] all over the card

c
sorry, but that's not it. Try once more.
b
Very good. Let's go on to the next question.
//ss009 //Note that the picture of the Keysort card shows that the school code has been notched.
What is the school number that has been notched into the card?
help
24
24
If the keysort needle is passed through a deck of cards, and this card was in the deck, would it fall into the tray or remain on the needle if you wanted schools 10-19?
remain on the needle
If we want to identify the cards used to register boys from those used to register girls, only one position or code field would be necessary. The cards used for boys could be notched, and the ones used for girls would not be notched.//ss010x//
Therefore, boys' cards would fall to the tray and the girls' cards would -----.
remain
The keysort process is the first of our simple automated devices for processing data that resembles the equipment used in card processing systems of today. Our next section will be on unit record systems of processing data. Before we can go on to our new work, we will have a short quiz on the material we have already covered.
If you wish to take the quiz, please type yes. If you do not wish to take the quiz at this time, please type no.
yes
1. The simplest form of automated device is -------.
help
No help given.

carbon paper
Try the next one.
2. Name one other simple automated device.
embossed plate
Let:s go on.

5. A credit card is a form of the ------.
embossed plate
Try the next question.
4. The ------ uses numbered pegs to align forms.
peg board
Each answer is being recorded. You may obtain your score at the end of the test from your instructor.
5. The holes around the edge of the ----- card are notched to record data.
keysort
Go on.
6. Although data is recorded manually on the keysort card, the selection or sorting of cards is -----.
automatic
Next question.
7. The unnotched holes on the keysort card cause the cards to ----- on the needle.
stay
You have completed the quiz.
Would you like to know your score? Type yes or no.
yes
You received an A. Let:s go on to the next section. Please depress the a key.
a

Section 2

We can conclude from the previous section on simple devices that automation is not a machine. Rather it is a process. The chief aim of automation is to reduce human effort and handling to obtain less error. The secondary aim is to increase the processing speed. We shall now attempt to apply the principles of automation to Data Processing.

Data processing is the processing of information. The huge volumes of data that must be handled every day by business, science and government staggers the imagination. It is physically impossible to process, catalogue and store all the vast quantities of information accumulated by all sources without the help of machines. Automated equipment enables us to gather data, manipulate it, draw conclusions from it, and store it for future use. Routine handling can be performed at high speeds, freeing men and women for more important tasks. These machines can do many of the tasks that humans find boring without becoming bored. Because our machines do not become bored or tired, they make very few mistakes. Most errors that do occur are the result of human error or machine malfunction.

All information handling, or data processing, goes through a cycle. First, the data to be processed must be assembled. Then it must be recorded in a convenient form. Next, it must be manipulated. The results must be reported. Finally, it must be stored. The next slide shows the data processing cycle in sequence. Please depress the response key.
//ss010 //
end of course.
you have been signed off.

```
demo1,a0001
your name is        R. R. Reynolds
type control word
type reyn//finish
reyn
begin
    1       rd              Introduction to Data Processing
    2
    3                               Prepared by
    4
    5                           Mr. Robert R. Reynolds
    6
    7                               for
    8
    9                       Computer Assisted Instruction
   10
   11                           Providence College
   12
   13                        Providence, Rhode Island
   14
   15                               1965--1966


   16              You are about to begin a course designed to introduce you to some of
   17
   18          the automated devices used to process data. The course is divided into
   19
   20          three basic sections:
   21
   22                                  1. Simple devices
   23
   24                                  2. Unit Record Equipment
   25
   26                                  3. Electronic Computer
   27
   28              Please depress the response key [Altn coding and 5].
   29
  secla
    1       rd      The objective of this section is to acquaint you with some
    2           of the simple automated devices used in the modern business world.
    3           Carbon paper is the simplest automated device.  The im-
    4           pression of the original is transferred to a copy by the carbon
    5           automatically.
    6               Sensitized paper, developed by the National Cash Register
    7           Company, is our next simple device.  This paper is treated
    8           with chemicals.  Original impressions are transferred automa-
    9           tically to the copies without the smudging or mess of carbon paper.
   10               Our next device is familiar to most people.  Credit cards, charge
   11           account plates, name and address plates, etc., are forms of the
   12           embossed plate.  Embossed plates are made of plastic or metal.
   13           Data on the plate is raised or embossed.  Carbon paper or an
   14           inked ribbon is placed between the document and the plate.
   15           Pressure is applied by a roller, and the data is transferred.
   16               Please key an eob [altn coding and 5].
  seclaql
    1       qu  Indicate your answers by using the LETTER ONLY.

    2           Which of the following is the simplest form of automated device used in to-

    3           day's business office?
    4                               [a]  Embossed plate
    5                               [b]  Sensitized paper
    6                               [c]  Punched card
    7                               [d]  Carbon paper
```

```
        ca d
        cb
        ty Very good. Let's go on.
        wa carbon paper
        wb Carbon paper
        wa cbn ppr
        fn kl        //2nt//Typing error.
        ty Incorrect. You did not follow directions. You were asked to use the LETTER
           only to indicate your answer. Please follow directions and try again.
        un Incorrect. Try again.
        un Incorrect. Did you follow the directions carefully? Try again.
        un Incorrect. The correct answer is d, carbon paper. Let's be a bit more

           careful when reading and make sure you follow the directions. Go on to
           the next question.
        br seclaq2
seclaq2
        qu Paper that has been treated with chemicals and is used to make copies of
           an original document is called:
                           [a]  Carbon paper
                           [b]  Inked paper
                           [c]  Sensitized paper
                           [d]  Copy paper
        ca c
        cb C
        ty Very good.
        wa sensitized paper
        wb Sensitized paper
        wa sens ppr
        fn kl        //2nt//Typing error.
        ty You did not follow directions. Use the LETTER ONLY! Try again.
        un Sorry. Try again.
        un The correct answer is c, sensitized paper. Go on to the next question.
        br seclaq3
seclaq3
        qu The impression of an ------  ------ is made by means of a pressure roller
           and carbon paper or inked ribbon.
                           [a]  Embossed plate
                           [b]  Identification cards
                           [c]  Invoice
                           [d]  Order
        ca a
        cb A
        ty Fine. Now you are ready to go on to the next assignment.
        wa embossed plate
        wb Embossed plate
        wa embsd plt
        fn kl        //2nt//Typing error.
        ty You did not follow directions. Use only the LETTER. Try
           again.
        un Afraid not. Try again.
        un What happened!! That's not right either. Try once more.
        un Nope.  You should have answered a, embossed plate.  Let:s
           try the next assignment.
        br sec1b
sec1b
        rd
             Another simple automated device is the pegboard.  A peg-
           board is a flat writing surface with numbered pegs or posts along
           one side.  Forms are punched with holes to match the pegs for
           alignment.
             Look at the first illustration.  When you are ready to go
```

```
   7          on, key an eob [altn coding and 5].
   8        rd      Data is transferred from one form to another by carbon or
   9           sensitized paper.  The master list is placed on the pegboard
  10           first.  Then the carbon paper is placed on top.  Each addi-
  11           tional form is then placed on top.  The original is the last to
  12           be set on the pegboard.  All forms to be used must be coordi-
  13           nated.
  14                Each original is aligned to the pegs in descending order.
  15           As our illustration demonstrates, each check would be placed on
  16           the pegboard a bit lower than the one before it.  When we are
  17           finished, we will have a master list or listing without having to
  18           copy the data from the original several times.
  19                Please key an eob.
  20        ty //ss002x//
seclbq1
   1        qu Indicate your answer by typing the word or words that identify
   2           your selection.
   3           A flat writing surface with numbered pegs along one edge is
   4           known as a --------.
   5        ca no help given.

   6        ca pegboard
   7        cb Pegboard
   8        ca pgbd
   9        fn kl         //1nt//Watch your typing.
  10        ty You are correct.
  11        wa peg board
  12        wb Peg board
  13        wa pg bd
  14        fn kl         //2nt//Typing error.
  15        ty Okay, but pegboard is one word.
  16        br seclbq2
  17        un This answer is not correct. Remember that typing errors are

  18           considered as incorrect answers. Try again.
  19        un I'm afraid not. LET␣S GO BACK AND READ AGAIN.
  20        br seclb
seclbq2
   1        qu Data on the original is transferred to a copy or master list

   2           by means of -------.
   3        ca no help given.

   4        ca carbon
   5        cb carbon paper
   6        ca cbn pr
   7        fn kl         //2nt//Be careful of typing errors.
   8        cb sensitized paper
   9        cb sens pr
  10        fn kl         //2nt//Watch your typing errors.
  11        cb carbon or sensitized paper
  12        cb sensitized or carbon paper
  13        cb cbn or sens pr
  14        fn kl         //4nt//Typing error.
  15        fn editls     //sh//c/r
  16        ty Your answer is correct. Let's go on.
  17        un Wrong. LET␣S TRY AGAIN.
  18        un Check your typing and try again.
  19        un Sign off and get help from your instructor.
seclb q3
   1        qu Forms are aligned or lined up by using the numbered ----- along
   2           the edge of the board.
   3        ca no help given.
```

```
4         ca posts
5         cb pegs
6         cb pegs or posts
7         cb posts or pegs
8         fn editls    //sh//c/r
9         ty That's it,  You are doing well.  Keep it up.
10        un That's not it.  Try once more.
11        un What's the matter?  That is not the correct answer.  Let's go on anyway and see if you cannot do better.
12        br seclb q4
seclb q4
1         qu The advantage of using a pegboard is that we may have a copy or
2            a ----- without having to rewrite the data on the original document.
3         ca no help given.

4         ca master list
5         cb master
6         ca mstr lst
7         fn kl        //2rt//Be careful of typing errors.
8         ca listing
9         ca lstg
10        fn kl        //1nt//watch typing errors.
11        fn editls    //sh//c/r
12        wa duplicate
13        fn editls    //sh//c/r
14        ty This is a good try, but I was looking for a term mentioned in the text.
15           Try again.
16        un This answer is not correct.  Try again.
17        un We still can:t seem to get together.  Try once more.
18        un The correct answer is master list.  Let's go on.
19        br seclb q5
seclb q5
1         qu Forms used with the pegboard are aligned with the pegs on the board by means
2            of------on the edge of the form.
3         ca no help given.

4         ca punched holes
5         fn editls    //sh//sp//c/r
6         ca holes
7         fn editls    //sh//c/r
8         ty Fine.  Your answer is correct.  Let's try the next section.
9         un Sorry, try again.
10        un Sign off and see your instructor.
seclc
1         rd      Our final simple device is a bit more complex than the
2            others.  The Keysort Process uses a card with holes punched on
3            the edges of the card.
4                 Please turn to the second illustration.
5         rd      Information is recorded on the card by notching the holes.
6            These holes may be grouped together to represent data.  Holes
7            grouped in this manner are called code fields.  The number of
8            holes in each group may vary to meet the needs of the user.  A
9            code known as the binary code is used to represent data.  Only
10           numeric data may be recorded.
11                When you are ready to go on, please key an eob.
12        rd      Inorder to sort or select data from the cards, we pass a
13           steel rod or needle through the holes in the edge of a deck of
14           cards.  The cards that have been notched will fall from the
15           needle, and the unnotched cards will remain on the needle.  This
16           procedure will be followed for each position in the code field.
17           Once data has been recorded manually into the cards, the sort-
18           ing or selection of data is automatic.
19                Please key an eob.
```

```
 19                Please key an eob.
sec1c q1
  1        qu Supply only the LETTER that indicates your answer.
    The fields on a keysort card  are:
  2                              [a] on the top
  3                              [b] on the edge
  4                              [c] in the middle
  5                              [d] all over the card
  6        ca b
  7        fn edit1s    //sh//c/r
  8        ty Very good.  Let's go on to the next question.
  9        wa d
 10        ty This is not quite correct, but why don't you try again.
 11        un sorry, but that's not it.  Try once more.
 12        un The correct answer is b, on the edge.  Go on to the next
 13            question.
 14        br sec1c q2
sec1c q2
  1        qu //ss009 //
  2           Note that the picture of the Keysort card shows that the school
  3           code has been notched.
  4           What is the school number that has been notched into the card?
  5        ca 24
  6        ca twentyfour
  7        fn edit1s    //sh//sp//c/r
  8        un Did you look at the school code?  Try again.
  9        un Try 24.
sec1c q3
  1        qu If the keysort needle is passed through a deck of cards, and this card
  2           was in the deck, would it fall into the tray or remain on the needle if
  3           you wanted schools 10-19?
  4        ca remainontheneedle
  5        fn edit1s    //all
  6        ca remain
  7        fn edit1s    //sh//c/r
  8        ty We can also conclude from your answer that this card must contain data
  9           concerning some other school.  So it is possible to obtain two types
 10           of data from the keysort card--positive or negative.
 11        un Unnotched cards would remain on the needle.  Notched cards would fall
 12           to the tray.
 13        br sec1c q4
sec1c q4
  1        qu If we want to identify the cards used to register boys from those used to
  2           register girls, only one position or code field would be necessary.  The
  3           cards used for boys could be notched, and the ones used for girls would not
  4           be notched.//ss010x//
  5                Therefore, boys' cards would fall to the tray and the girls' cards would
  6           -----.
  7        ca remainontheneedle
  8        fn edit1s    //all
  9        ca remain
 10        fn edit1s    //sh//c/r
 11        un remain on the needle.
 12        br sec1c q5
sec1c q5
  1        qu      The keysort process is the first of our simple automated devices for
  2           processing data that resembles the equipment used in card processing systems
  3           of today.  Our next section will be on unit record systems of processing
  4           data.  Before we can go on to our new work, we will have a short quiz on
  5           the material we have already covered.
  6                If you wish to take the quiz, please type yes.  If you do not wish to
  7           take the quiz at this time, please type no.
  8        ca yes
  9        fn edit1s    //sh//c/r
```

```
 10         wa no
 11         fn edit1s    //sh//c/r
 12         ty When you are ready to take the quiz, please use the following format.  Use
 13            the control words--go to--and the label sec1test.  You should copy this
 14            format before signing off.  Please sign off.
 15         un Please type yes or no!
sec1test
  1         qu 1.  The simplest form of automated device is -------.
  2         ca No help given.
  3         ca carbonpaper
  4         fn edit1s    //all
  5         ad 1//c1
  6         ty Try the next one.
  7         un Try the next one.
  8         ad 1//c1
  9         br test1q2
test1q2
  1         qu 2.  Name one other simple automated device.
  2         ca No help given.
  3         ca embossedplate
  4         cb sensitizedpaper
  5         cb pegboard
  6         cb keysort
  7         cb keysortprocess
  8         fn edit1s    //all
  9         ad 1//c1
 10         ty Let:s go on.
 11         un Let:s go on.
 12         ad 1//c2
 13         br test1q3
test1q3
  1         qu 3.  A credit card is a form of the ------.
  2         ca No help given.
  3         ca embossedplate
  4         fn edit1s    //all
  5         ad 1//c1
  6         ty Try the next question.
  7         un Try the next question.
  8         ad 1//c2
  9         br test1q4
test1q4
  1         qu 4.  The ------ uses numbered pegs to align forms.
  2         ca No help given.
  3         ca pegboard
  4         fn edit1s    //all
  5         ad 1//c1
  6         ty Each answer is being recorded.  You may obtain your score at
  7         ty the end of the test from your instructor.
  8         un Each response is being recorded.  You may obtain your score at
  9            the end of the test from your instructor.
 10         ad 1//c2
 11         br test1q5
test1q5
  1         qu 5.  The holes around the edge of the ----- card are notched to
  2            record data.
  3         ca No help given.
  4         ca keysort
  5         fn edit1s    //all
  6         ad 1//c1
  7         ty Go on.
  8         un Go on.
  9         ad 1//c2
 10         br test1q6
```

```
test1q6
   1        qu 6.  Although data is recorded manually on the keysort card, the
   2           selection or sorting of cards is -----.
   3        ca No help given.
   4        ca automatic
   5        fn edit1s    //all
   6        ad 1//c1
   7        ty Next question.
   8        un Next question.
   9        ad 1//c2
  10        br test1q7
test1q7
   1        qu 7.  The unnotched holes on the keysort card cause the cards to
   2           ----- on the needle.
   3        ca No help given.
   4        ca remain
   5        cb stay
   6        fn edit1s    //all
   7        ad 1//c1
   8        ty You have completed the quiz.
   9        un You have completed the quiz.
  10        ad 1//c2
  11        br test1end
test1end
   1        qu Would you like to know your score?  Type yes or no.
   2        ca yes
   3        br scrt1d    //-4//c1
   4        br scrt1c    //-5//c1
   5        br scrt1b    //-6//c1
   6        br scrt1a    //-7//c1
   7        ca no
   8        ty You may obtain your score from your instructor at a later time.
   9        rd Please depress the eob [altn coding and 5].
  10        br sec2
scrt1a
   1        qu You received an A.  Let:s go on to the next section.  Please
   2           depress the a key.
   3        ca a
   4        br sec2
   5        un Please depress the a key!
scrt1b
   1        qu You received a B.  Proceed to the next section.  Please
   2           depress the a key.
   3        ca a
   4        br sec2
   5        un Please depress the a key!
scrt1c
   1        qu You received a C.  Proceed to the next section.  Please
   2           depress the a key.
   3        ca a
   4        br sec2
   5        un Please depress the a key!
scrt1d
   1        qu You did not do too well.  Your grade is a D.  This means
   2           you had 3 or more incorrect answers.  Let:s see if you can do a
   3         better job on the next section.  Please strike the a key.
   4        ca a
   5        br sec2
   6        un Please strike the a key!
```

```
sec2
   1        rd                    Section 2
   2             We can conclude from the previous section on simple devices that automation
   3          is not a machine.  Rather it is a process.  The chief aim of automation is to
   4          reduce human effort and handling to obtain less error.  The secondary aim is to
   5          increase the processing speed.  We shall now attempt to apply the principles of
   6          automation to Data Processing.
   7               Data processing is the processing of information.  The huge volumes of data
   8          that must be handled every day by business, science and government staggers the
   9          imagination.  It is physically impossible to process, catalogue and store all the
  10          vast quantities of information accumulated by all sources without the help of machines.
  11          Automated equipment enables us to gather data, manipulate it, draw conclusions
  12          from it, and store it for future use.  Routine handling can be performed at high
  13          speeds, freeing men and women for more important tasks. These machines can do many
  14          of the tasks that humans find boring without becoming bored.  Because our machines
  15          do not become bored or tired, they make very few mistakes.  Most errors that do
  16          occur are the result of human error or machine malfunction.
  17               All information handling, or data processing, goes through a cycle.  First,
  18          the data to be processed must be assembled.  Then it must be recorded in a convenient
  19          form.  Next, it must be manipulated.  The results must be reported.  Finally,
  20          it must be stored.  The next slide shows the data processing cycle in sequence.
  21          Please depress the response key.
  22        ty //ss010 //
finish
type control word
sign off
you have been signed off.
```

```
                                                                                0203451
                                                                                0203502
KEYN      ‡                                                                     0203553
BEGIN     ‡
    1   RD          I NTRODUCTION TO  D ATA  P ROCESSING ‡                     0203616
    2       ‡                                                                   0203630
    3                     P REPARED BY ‡                                        0203677
    4       ‡                                                                   0203691
    5                   M R.  R OBERT  R. R EYNOLDS ‡                         0203748
    6       ‡                                                                   0203762
    7                       FOR ‡                                             0203803
    8       ‡                                                                   0203817
    9                 C OMPUTER  A SSISTED  I NSTRUCTION ‡                    0203876
   10       ‡                                                                   0203890
   11                   P ROVIDENCE  C OLLEGE ‡                               0203941
   12       ‡                                                                   0203955
   13                 P ROVIDENCE,  R HODE  I SLAND ‡                         0204011
   14       ‡                                                                   0204025
   15                       1965--1966       ‡                                 0204076
   16       ‡                                                                   0204090
   17             Y OU ARE ABOUT TO BEGIN A COURSE DESIGNED TO INTRODUCE YOU TO SOME OF ‡  0204179
   18       ‡                                                                   0204193
   19      THE AUTOMATED DEVICES USED TO PROCESS DATA.  T HE COURSE IS DIVIDED INTO   ‡  0204261
   20       ‡                                                                   0204295
   21      THREE BASIC SECTIONS 6  ‡                                           0204332
   22       ‡                                                                   0204346
   23                       1.  S IMPLE DEVICES ‡                              0204395
   24       ‡                                                                   0204409
   25                       2.  U NIT  R ECORD  E QUIPMENT ‡                   0204469
   26       ‡                                                                   0204483
   27                       3.  E LECTRONIC  C OMPUTER ‡                       0204539
   28       ‡                                                                   0204553
   29             P LEASE DEPRESS THE RESPONSE KEY  9A LTN CODING AND 5 0 . ‡   0204630
SECIA     ‡                                                                     0264602
    1   RD          T HE OBJECTIVE OF THIS SECTION IS TO ACQUAINT YOU WITH SOME ‡  0264681
    2      OF THE SIMPLE AUTOMATED DEVICES USED IN THE MODERN BUSINESS WORLD. ‡  0264761
    3       C ARBON PAPER IS THE SIMPLEST AUTOMATED DEVICE.   T HE IM- ‡        0264834
    4      PRESSION OF THE ORIGINAL IS TRANSFERRED TO A COPY BY THE CARBON ‡    0264911
    5      AUTOMATICALLY. ‡                                                     0264939
    6           S ENSITIZED PAPER, DEVELOPED BY THE  N ATIONAL  C ASH  R EGISTER ‡  0265023
    7       C OMPANY, IS OUR NEXT SIMPLE DEVICE.   T HIS PAPER IS TREATED ‡     0265099
    8      WITH CHEMICALS.   O RIGINAL IMPRESSIONS ARE TRANSFERRED AUTOMA- ‡    0265176
    9      TICALLY TO THE COPIES WITHOUT THE SMUDGING OR MESS OF CARBON PAPER. ‡  0265257
   10           O UR NEXT DEVICE IS FAMILIAR TO MOST PEOPLE.   C REDIT CARDS, CHARGE ‡  0265345
   11      ACCOUNT PLATES, NAME AND ADDRESS PLATES, ETC., ARE FORMS OF THE ‡     0264171
   12      EMBOSSED PLATE.   E MBOSSED PLATES ARE MADE OF PLASTIC OR METAL. ‡    0264249
   13       D ATA ON THE PLATE IS RAISED OR EMBOSSED.   C ARBON PAPER OR AN ‡    0264327
   14      INKED RIBBON IS PLACED BETWEEN THE DOCUMENT AND THE PLATE. ‡          0264399
   15       P RESSURE IS APPLIED BY A ROLLER, AND THE DATA IS TRANSFERRED. ‡     0264539
   16           P LEASE KEY AN EOB  9 ALTN CODING AND 5 0 . ‡                    0205936
SEC1AQ1   ‡                                                                     0205987
    1   QU  I NDICATE YOUR ANSWERS BY USING THE  LETTER ONLY .   ‡              0206054
    2       W HICH OF THE FOLLOWING IS THE SIMPLEST FORM OF AUTOMATED DEVICE USED IN TO-   ‡  0206147
    3      DAY@S BUSINESS OFFICE /  ‡                                           0206185
    4                          9 A 0  E MBOSSED PLATE ‡                         0206236
    5                          9 B 0  S ENSITIZED PAPER ‡                       0206293
    6                          9 C 0  P UNCHED CARD ‡                           0206344
    7                          9 D 0  C ARBON PAPER ‡
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                                                                                                                    0206395
                                                                                                                    0206409
                                                                                                                    0206425
 8   CA D#                                                                                                          0206466
 9   CB  D #                                                                                                        0206491
10   TY  V ERY GOOD.  L ET@S GO ON. #                                                                               0265422
11   WA CARBON PAPER#                                                                                               0265442
12   WB  C ARBON PAPER#                                                                                             0206518
13   WA CBN PPR#                                                                                                    0206614
14   FN KL          //2NT// T YPING ERROR. #                                                                        0206699
15   TY  I NCORRECT.  Y OU DID NOT FOLLOW DIRECTIONS.  Y OU WERE ASKED TO USE THE  LETTER  #                        0206738
16      ONLY TO INDICATE YOUR ANSWER.  P LEASE FOLLOW DIRECTIONS AND TRY AGAIN. #                                   0206820
17   UN  I NCORRECT.  T RY AGAIN. #                                                                                 0206911
18   UN  I NCORRECT.  D ID YOU FOLLOW THE DIRECTIONS CAREFULLY / T RY AGAIN. #                                      0206997
19   UN  I NCORRECT.  T HE CORRECT ANSWER IS D, CARBON PAPER.  L ET@S BE A BIT MORE  #                              0207029
20      CAREFUL WHEN READING AND MAKE SURE YOU FOLLOW THE DIRECTIONS.  G O ON TO #                                  0207080
21      THE NEXT QUESTION. #                                                                                       0207131
22   BR SEC1AQ2  #                                                                                                 0207219
SEC1AQ2  #                                                                                                         0207266
 1   QU  P APER THAT HAS BEEN TREATED WITH CHEMICALS AND IS USED TO MAKE COPIES OF #                               0207317
 2      AN ORIGINAL DOCUMENT IS CALLED 6  #                                                                        0207367
 3                        9 A 0  C ARBON PAPER #                                                                   0207422
 4                        9 B 0  I NKED PAPER #                                                                    0207471
 5                        9 C 0  S ENSITIZED PAPER #                                                               0207485
 6                        9 D 0  C OPY PAPER #                                                                     0207501
 7   CA C#                                                                                                          0207527
 8   CB  C #                                                                                                        0207556
 9   TY  V ERY GOOD. #                                                                                              0265488
10   WA SENSITIZED PAPER#                                                                                           0265509
11   WB  S ENSITIZED PAPER#                                                                                         0207587
12   WA SENS PPR#                                                                                                   0207669
13   FN KL          //2NT// T YPING ERROR. #                                                                        0207704
14   TY  Y OU DID NOT FOLLOW DIRECTIONS.  U SE THE  LETTER ONLY$ T RY AGAIN. #                                      0207792
15   UN  S ORRY.  T RY AGAIN. #                                                                                     0207843
16   UN  T HE CORRECT ANSWER IS C, SENSITIZED PAPER.  G O ON TO THE NEXT QUESTION. #                                0207894
17   BR SEC1AQ3  #                                                                                                 0207983
SEC1AQ3  #                                                                                                         0208030
 1   QU  T HE IMPRESSION OF AN ------  ------ IS MADE BY MEANS OF A PRESSURE ROLLER #                              0208083
 2      AND CARBON PAPER OR INKED RIBBON. #                                                                        0208142
 3                        9 A 0  E MBOSSED PLATE #                                                                 0208188
 4                        9 B 0  I DENTIFICATION CARDS #                                                           0208232
 5                        9 C 0  I NVOICE #                                                                        0208246
 6                        9 D 0  O RDER #                                                                          0208262
 7   CA A#                                                                                                          0208336
 8   CB  A #                                                                                                        0208363
 9   TY  F INE.  N OW YOU ARE READY TO GO ON TO THE NEXT ASSIGNMENT. #                                              0265555
10   WA EMBOSSED PLATE#                                                                                             0265577
11   WB  E MBOSSED PLATE#                                                                                           0208392
12   WA EMBSD PLT#                                                                                                  0208469
13   FN KL          //2NT// T YPING ERROR. #                                                                        0208489
14   TY  Y OU DID NOT FOLLOW DIRECTIONS.  U SE ONLY THE  LETTER .  T RY #                                           0208529
15      AGAIN. #                                                                                                   0208604
16   UN  A FRAID NOT.  T RY AGAIN. #                                                                                0208663
17   UN  W HAT HAPPENED $$ T HAT@S NOT RIGHT EITHER.  T RY ONCE MORE. #                                             0208721
18   UN  N OPE.  Y OU SHOULD HAVE ANSWERED A, EMBOSSED PLATE.  L ET 6 S #                                           0208772
19      TRY THE NEXT ASSIGNMENT. #                                                                                 0266858
20   BR SEC1B    #
SEC1B    #
 1   RD #
```

```
                                                                                0265623
                                                                                0265702
                                                                                0265781
                                                                                0265858
                                                                                0265882
                                                                                0265962
                                                                                0266015
                                                                                0266093
                                                                                0266169
                                                                                0266246
                                                                                0266325
                                                                                0266402
                                                                                0266422
                                                                                0266500
                                                                                0266579
                                                                                0266656
                                                                                0266735
                                                                                0266795
                                                                                0266834
    TY //SS002X// *                                                            0210407
SEC1B01  *                                                                      0210458
    QU  I NDICATE YOUR ANSWER BY TYPING THE WORD OR WORDS THAT IDENTIFY *       0210536
        YOUR SELECTION. *                                                       0210565
        A  FLAT WRITING SURFACE WITH NUMBERED PEGS ALONG ONE EDGE IS *          0210640
        KNOWN AS A --------. *                                                  0210674
    CA NO HELP GIVEN.      *                                                    0210706
    CA PEGBOARD*                                                                0210727
    CB  P EGBOARD*                                                              0266871
    CA PGBD*                                                                    0266888
    FN KL          //1NT// W ATCH YOUR TYPING. *                              0210750
    TY  Y OU ARE CORRECT. *                                                     0210782
    WA PEG BOARD*                                                               0210804
    WB  P EG BOARD*                                                             0266939
    WA PG BD*                                                                   0266957
    FN KL          //2NT// T YPING ERROR. *                                   0210828
    TY  O KAY, BUT PEGBOARD IS ONE WORD. *                                      0210875
    BR SEC1B02   *                                                              0210926
    UN  T HIS ANSWER IS NOT CORRECT.  R EMEMBER THAT TYPING ERRORS ARE   *      0211005
        CONSIDERED AS INCORRECT ANSWERS.  T RY AGAIN. *                         0211064
    UN  I @M AFRAID NOT.  LET@S GO BACK AND READ AGAIN. *                       0211126
    BR SEC1B      *                                                             0211177
SEC1B02  *                                                                      0211228
    QU  D ATA ON THE ORIGINAL IS TRANSFERRED TO A COPY OR MASTER LIST   *       0211306
        BY MEANS OF --------. *                                                 0211340
    CA NO HELP GIVEN.      *                                                    0211372
    CA CARBON*                                                                  0211391
    CB CARBON PAPER*                                                            0267003
    CA CBN PR*                                                                  0267022
    FN KL          //2NT// B E CAREFUL OF TYPING ERRORS. *                     0211416
    CB SENSITIZED PAPER*                                                        0267063
    CB SENS PR*                                                                 0267103
    FN KL          //2NT// W ATCH YOUR TYPING ERRORS. *                       0211445
    CB CARBON OR SENSITIZED PAPER*                                              0211464
    CB SENSITIZED OR CARBON PAPER*                                              0267161
    CB CBN OR SENS PR*                                                          0267180
    FN KL          //4NT// T YPING ERROR. *                                   0211523
    FN EDITIS      //SH//C/R*
```

```
                                                                                                                    021155
 16   TY  Y OUR ANSWER IS CORRECT.  L ETaS GO ON. #                                                                 021160
 17   UN  w RONG.  LETaS TRY AGAIN. #                                                                               021164
 18   UN  C HECK YOUR TYPING AND TRY AGAIN. #                                                                       021169
 19   UN  S IGN OFF AND GET HELP FROM YOUR INSTRUCTOR. #                                                            021175
SEC1B Q3  #                                                                                                        021180
  1   QU  F ORMS ARE ALIGNED OR LINED UP BY USING THE NUMBERED ----- ALONG #                                        021188
  2       THE EDGE OF THE BUARD. #                                                                                 021192
  3   CA NO HELP GIVEN.     #                                                                                      021195
  4   CA POSTS#                                                                                                    021197
  5   CB PEGS#                                                                                                     021198
  6   CB PEGS OR POSTS#                                                                                            021201
  7   CB POSTS OR PEGS#                                                                                            021204
  8   FN EDITIS    //SH//C/R#                                                                                     021207
  9   TY  T HATaS IT,   Y OU ARE DOING WELL.   K EEP IT UP. #                                                      021213
 10   UN  T HATaS NOT IT.   T RY ONCE MORE. #                                                                      021218
 11   UN  w HATaS THE MATTER /  T HAT IS NOT THE CORRECT ANSWER.   L ETaS GO ON ANYwAY AND SEE IF                  021230
       YOU CANNOT DO BETTER. #                                                                                     021236
 12   BR SEC1B Q4  #                                                                                               021241
SEC1B Q4  #                                                                                                        021249
  1   QU  T HE ADVANTAGE OF USING A PEGBOARD IS THAT WE MAY HAVE A COPY OR #                                       021257
  2       A ----- WITHOUT HAVING TO REWRITE THE DATA ON THE ORIGINAL DOCUMENT. #                                   021260
  3   CA NO HELP GIVEN.     #                                                                                      021262
  4   CA MASTER LIST#                                                                                            026723
  5   CB MASTER#                                                                                                 026725
  6   CA MSTR LST#                                                                                               026731
  7   FN KL        //2NT// B E CAREFUL OF TYPING ERRORS. #                                                       026733
  8   CA LISTING#                                                                                                026735
  9   CA LSTG#                                                                                                   021264
 10   FN KL        //1NT// W ATCH TYPING ERRORS. #                                                              021267
 11   FN EDITIS    //SH//C/R#                                                                                   021270
 12   WA DUPLICATE#                                                                                              021273
 13   FN EDITIS    //SH//C/R#                                                                                   021282
 14   TY  T HIS IS A GOOD TRY, BUT  I  WAS LOOKING FOR A TERM MENTIONED IN THE TEXT. #                           021284
 15       T RY AGAIN. #                                                                                          021290
 16   UN  T HIS ANSWER IS NOT CORRECT.   T RY AGAIN. #                                                           021297
 17   UN  W E STILL CAN 6 T SEEM TO GET TOGETHER.   T RY ONCE MORE. #                                            021304
 18   UN  T HE CORRECT ANSWER IS MASTER LIST.   L ETaS GO ON.  #                                                 021308
 19   BR SEC1B Q5  #                                                                                             021314
SEC1B Q5  #                                                                                                        021327
  1   QU  F ORMS USED wITH THE PEGBOARD ARE ALIGNED WITH THE PEGS ON THE BOARD BY MEANS #                        021328
  2       OF------ON THE EDGE OF THE FORM. #                                                                     021332
  3   CA NO HELP GIVEN.     #                                                                                    021333
  4   CA PUNCHED HOLES#                                                                                          021334
  5   FN EDITIS    //SH//SP//C/R#                                                                               021338
  6   CA HOLES#                                                                                                  021339
  7   FN EDITIS    //SH//C/R#                                                                                   021340
  8   TY  F INE.   Y OUR ANSWER IS CORRECT.   L ETaS TRY THE NEXT SECTION. #                                    021350
  9   UN  S ORRY, TRY AGAIN. #                                                                                   021354
 10   UN  S IGN OFF AND SEE YOUR INSTRUCTOR.#                                                                    021358
SEC1C     #                                                                                                        02674
  1   RD       O UR FINAL SIMPLE DEVICE IS A BIT MORE COMPLEX THAN THE #                                         02687
  2       OTHERS.   T HE  K EYSORT  P ROCESS USES A CARD WITH HOLES PUNCHED ON #                                 02675
  3       THE EDGES OF THE CARD. #                                                                             02687
  4            P LEASE TURN TO THE SECOND ILLUSTRATION. #                                                      02676
  5   RD       I NFORMATION IS RECORDED ON THE CARD BY NOTCHING THE HOLES. #                                   02677
  6        T HESE HOLES MAY BE GROUPED TOGETHER TO REPRESENT DATA.   H OLES #
```

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                                                                                                                    0267818
    7       GROUPED IN THIS MANNER ARE CALLED CODE FIELDS.   T HE NUMBER OF ¢                                       0267895
    8       HOLES IN EACH GROUP MAY VARY TO MEET THE NEEDS OF THE USER.   A  ¢                                       0267973
    9       CODE KNOWN AS THE BINARY CODE IS USED TO REPRESENT DATA.   O NLY ¢                                       0268051
   10       NUMERIC DATA MAY BE RECORDED. ¢                                                                          0268094
   11            W HEN YOU ARE READY TO GO ON, PLEASE KEY AN EOB. ¢                                                  0268162
   12    RD      I NURDER TO SORT OR SELECT DATA FROM THE CARDS, WE PASS A ¢                                         0268239
   13       STEEL ROD OR NEEDLE THROUGH THE HOLES IN THE EDGE OF A DECK OF ¢                                         0268315
   14       CARDS.   T HE CARDS THAT HAVE BEEN NOTCHED WILL FALL FROM THE  ¢                                         0268391
   15       NEEDLE, AND THE UNNOTCHED CARDS WILL REMAIN ON THE NEEDLE.   T HIS ¢                                     0268471
   16       PROCEDURE WILL BE FOLLOWED FOR EACH POSITION IN THE CODE FIELD. ¢                                        0268548
   17        O NCE DATA HAS BEEN RECORDED MANUALLY INTO THE CARDS, THE SORT- ¢                                       0268626
   18       ING OR SELECTION OF DATA IS AUTOMATIC. ¢                                                                 0268676
   19            P LEASE KEY AN EOB. ¢                                                                               0214772
SEC1C Q1  ¢                                                                                                         0214823
    1   QU  S UPPLY ONLY THE  LETTER  THAT INDICATES YOUR ANSWER.                    T HE FIELDS ON A KEYS          0214942
        ORT CARD  ARE 6  ¢                                                                                          0214990
                          9 A 0  ON THE TOP ¢                                                                       0215039
    2                     9 B 0  ON THE EDGE ¢                                                                      0215090
    3                     9 C 0  IN THE MIDDLE ¢                                                                    0215145
    4                     9 D 0  ALL OVER THE CARD ¢                                                                0215197
    5                                                                                                               0215191
    6   CA B¢                                                                                                       0215254
    7   FN EDITIS    //SH//C/R¢                                                                                     0215326
    8   TY  V ERY GOOD.   L ET@S GO ON TO THE NEXT QUESTION. ¢                                                      0215339
    9   WA D¢                                                                                                       0215396
   10   TY  T HIS IS NOT QUITE CORRECT, BUT WHY DON@T YOU TRY AGAIN. ¢                                              0215469
   11   UN SORRY, BUT THAT@S NOT IT.   T RY ONCE MORE. ¢                                                           0215496
   12   UN  T HE CORRECT ANSWER IS B, ON THE EDGE.   G O ON TO THE NEXT¢                                           0215547
   13        QUESTION.  ¢                                                                                         0215598
   14   BR SEC1C Q2  ¢                                                                                             0215671
SEC1C Q2  ¢                                                                                                         0215702
    1   QU //SS009 //¢                                                                                             0215736
    2        N OTE THAT THE PICTURE OF THE  K EYSORT CARD SHOWS THAT THE SCHOOL ¢                                    0215816
    3       CODE HAS BEEN NOTCHED. ¢                                                                                0215833
    4        W HAT IS THE SCHOOL NUMBER THAT HAS BEEN NOTCHED INTO THE CARD /  ¢                                    0215856
    5   CA 24¢                                                                                                      0215892
    6   CA TWENTYFOUR¢                                                                                             0215956
    7   FN EDITIS    //SH//SP//C/R¢                                                                                 0215979
    8   UN  D ID YOU LOOK AT THE SCHOOL CODE /    T RY AGAIN. ¢                                                     0216030
    9   UN  T RY 24. ¢                                                                                            0216114
SEC1C Q3  ¢                                                                                                         0216203
    1   QU  I F THE KEYSORT NEEDLE IS PASSED THROUGH A DECK OF CARDS, AND THIS CARD ¢                               0216246
    2        WAS IN THE DECK, WOULD IT FALL INTO THE TRAY OR REMAIN ON THE NEEDLE IF ¢                               0216276
    3        YOU WANTED SCHOOLS 10-19 /  ¢                                                                          0216304
    4   CA REMAINCNTHENEEDLE¢                                                                                       0216323
    5   FN EDITIS    //ALL¢                                                                                          0216355
    6   CA REMAIN¢                                                                                                  0216441
    7   FN EDITIS    //SH//C/R¢                                                                                     0216527
    8   TY  W E CAN ALSO CONCLUDE FROM YOUR ANSWER THAT THIS CARD MUST CONTAIN DATA ¢                               0216595
    9        CONCERNING SOME OTHER SCHOOL.   S O IT IS POSSIBLE TO OBTAIN TWO TYPES ¢                               0216682
   10        OF DATA FROM THE KEYSORT CARD--POSITIVE OR NEGATIVE. ¢                                                 0216708
   11   UN  U NNOTCHED CARDS WOULD REMAIN ON THE NEEDLE.   N OTCHED CARDS WOULD FALL ¢                             0216759
   12       TO THE TRAY. ¢                                                                                         0216810
   13   BR SEC1C Q4  ¢                                                                                             0216899
SEC1C Q4  ¢
    1   QU  I F WE WANT TO IDENTIFY THE CARDS USED TO REGISTER BOYS FROM THOSE USED TO ¢
    2        REGISTER GIRLS, ONLY ONE POSITION OR CODE FIELD WOULD BE NECESSARY.   T HE ¢
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                                                                                                                    0216989
    3      CARDS USED FOR BOYS COULD BE NOTCHED, AND THE ONES USED FOR GIRLS WOULD NOT .                            0217078
    4        BE NOTCHED.//SS010X// .                                                                                0217115
    5           T HEREFORE, BOYS' CARDS WOULD FALL TO THE TRAY AND THE GIRLS' CARDS WOULD .                         0217208
    6        -----. .                                                                                               0217226
    7    CA REMAINCNTHENEEDLE.                                                                                      0217258
    8    FN EDITIS     //ALL.                                                                                       0217286
    9    CA REMAIN.                                                                                                 0217305
   10    FN EDITIS     //SH//C/R.                                                                                  0217337
   11    UN REMAIN ON THE NEEDLE..                                                                                  0217371
   12    BR SEC1C Q5  .                                                                                             0217422
SEC1C Q5  .                                                                                                       0217473
    1    QU         T HE KEYSORT PROCESS IS THE FIRST OF OUR SIMPLE AUTOMATED DEVICES FOR .                        0217562
    2          PROCESSING DATA THAT RESEMBLES THE EQUIPMENT USED IN CARD PROCESSING SYSTEMS .                       0217654
    3          OF TODAY.   O UR NEXT SECTION WILL BE ON UNIT RECORD SYSTEMS OF PROCESSING .                         0217744
    4          CATA.   B EFORE WE CAN GO ON TO OUR NEW WORK, WE WILL HAVE A SHORT QUIZ ON .                         0217834
    5          THE MATERIAL WE HAVE ALREADY COVERED. .                                                              0217887
    6             I F YOU WISH TO TAKE THE QUIZ, PLEASE TYPE YES.   I F YOU DO NOT WISH TO .                        0217979
    7          TAKE THE QUIZ AT THIS TIME, PLEASE TYPE NO. .                                                        0218038
    8    CA YES.                                                                                                    0218054
    9    FN EDITIS     //SH//C/R.                                                                                  0218086
   10    WA NO.                                                                                                     0218101
   11    FN EDITIS     //SH//C/R.                                                                                  0218133
   12    TY  W HEN YOU ARE READY TO TAKE THE QUIZ, PLEASE USE THE FOLLOWING FORMAT.   U SE .                        0218225
   13          THE CONTROL WORDS--GO TO--AND THE LABEL SECITEST.   Y OU SHOULD COPY THIS .                          0218314
   14          FORMAT BEFORE SIGNING OFF.   P LEASE SIGN OFF. .                                                     0218376
   15    UN  P LEASE TYPE YES OR NO $  .                                                                            0218416
SEC1TEST  .                                                                                                       0218467
    1    QU 1.   T HE SIMPLEST FORM OF AUTOMATED DEVICE IS -------. .                                               0218536
    2    CA  N O HELP GIVEN.    .                                                                                   0218569
    3    CA CARBONPAPER.                                                                                            0218593
    4    FN EDITIS     //ALL.                                                                                       0218621
    5    AD 1//C1.                                                                                                  0218639
    6    TY  T RY THE NEXT ONE. .                                                                                   0218672
    7    UN  T RY THE NEXT ONE. .                                                                                   0218705
    8    AD 1//C1.                                                                                                  0218723
    9    BR TEST1Q2   .                                                                                             0218774
TEST1Q2   .                                                                                                       0218825
    1    QU 2.   N AME ONE OTHER SIMPLE AUTOMATED DEVICE. .                                                         0218884
    2    CA  N O HELP GIVEN.    .                                                                                   0218917
    3    CA EMBOSSEDPLATE.                                                                                          0218943
    4    CB SENSITIZEDPAPER.                                                                                        0218971
    5    CB PEGBOARD.                                                                                               0218992
    6    CB KEYSORT.                                                                                                0219012
    7    CB KEYSORTPROCESS.                                                                                         0219039
    8    FN EDITIS     //ALL.                                                                                       0219067
    9    AD 1//C1.                                                                                                  0219085
   10    TY  L ET 6 S GO ON. .                                                                                      0219115
   11    UN  L ET 6 S GO ON. .                                                                                      0219145
   12    AD 1//C2.                                                                                                  0219163
   13    BR TEST1Q3   .                                                                                             0219214
TEST1Q3   .                                                                                                       0219265
    1    QU 3.   A  CREDIT CARD IS A FORM OF THE -------. .                                                         0219323
    2    CA  N O HELP GIVEN.    .                                                                                   0219356
    3    CA EMBOSSEDPLATE.                                                                                          0219382
    4    FN EDITIS     //ALL.                                                                                       0219410
    5    AD 1//C1.
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                                                                                                                                0219428
    6   TY  I RY THE NEXT QUESTION. ♦                                                                                           0219466
    7   UN  T RY THE NEXT QUESTION. ♦                                                                                           0219504
    8   AD 1///C2♦                                                                                                              0219522
    9   BR TeST1G4   ♦                                                                                                          0219573
TEST1Q4    ♦                                                                                                                    0220000
    1   QU 4.   T HE ------ USES NUMBERED PEGS TO ALIGN FORMS. ♦                                                                0220065
    2   CA  N O HELP GIVEN.    ♦                                                                                                0220098
    3   CA PEGBOARD♦                                                                                                            0220119
    4   FN EDITIS    //ALL♦                                                                                                      0220147
    5   AD 1///C1♦                                                                                                              0220165
    6   TY  E ACH ANSWER IS BEING RECORDED.   Y OU MAY OBTAIN YOUR SCORE AT ♦                                                   0220243
    7   TY THE END OF THE TEST FROM YOUR INSTRUCTOR. ♦                                                                          0220296
    8   UN  E ACH RESPONSE IS BEING RECORDED.   Y OU MAY OBTAIN YOUR SCORE AT ♦                                                 0220378
    9      THE END OF THE TEST FROM YOUR INSTRUCTOR. ♦                                                                          0220433
   10   AD 1///C2♦                                                                                                              0220451
   11   BR TESTIG5   ♦                                                                                                          0220502
TEST1Q5    ♦                                                                                                                    0220553
    1   QU 5.   T HE HOLES AROUND THE EDGE OF THE ----- CARD ARE NOTCHED TO ♦                                                   0220631
    2      RECORD DATA. ♦                                                                                                       0220657
    3   CA  N O HELP GIVEN.    ♦                                                                                                0220690
    4   CA KEYSORT♦                                                                                                             0220710
    5   FN EDITIS    //ALL♦                                                                                                      0220736
    6   AD 1///C1♦                                                                                                              0220756
    7   TY  G O ON. ♦                                                                                                           0220776
    8   UN  G O ON. ♦                                                                                                           0220800
    9   AD 1///C2♦                                                                                                              0220816
   10   BR TESTIG6   ♦                                                                                                          0220869
TEST1Q6    ♦                                                                                                                    0220940
    1   QU 6.   A LTHOUGH DATA IS RECORDED MANUALLY ON THE KEYSORT CARD♦ THE ♦                                                  0220999
    2      SELECTION OR SORTING OF CARDS IS -----. ♦                                                                            0221052
    3   CA  N O HELP GIVEN.    ♦                                                                                                0221085
    4   CA AUTOMATIC♦                                                                                                           0221107
    5   FN EDITIS    //ALL♦                                                                                                      0221135
    6   AD 1///C1♦                                                                                                              0221153
    7   TY  N EXT QUESTION. ♦                                                                                                   0221183
    8   UN  N EXT QUESTION. ♦                                                                                                   0221213
    9   AD 1///C2♦                                                                                                              0221231
   10   BR TESTIG7   ♦                                                                                                          0221262
TEST1Q7    ♦                                                                                                                    0221331
    1   QU 7.   T HE UNNOTCHED HOLES ON THE KEYSORT CARD CAUSE THE CARDS TO ♦                                                   0221411
    2      ----- ON THE NEEDLE. ♦                                                                                               0221445
    3   CA  N O HELP GIVEN.    ♦                                                                                                0221480
    4   CA REMAIN♦                                                                                                              0221499
    5   CB STAY♦                                                                                                                0221516
    6   FN EDITIS    //ALL♦                                                                                                      0221544
    7   AD 1///C1                                                                                                               0221624
    8   TY  Y OU HAVE COMPLETED THE QUIZ. ♦                                                                                     0221668
    9   UN  Y OU HAVE COMPLETED THE QUIZ. ♦                                                                                     0221712
   10   AD 1///C2♦                                                                                                              0221730
   11   BR TeSTIeND  ♦                                                                                                          0221761
TESTIEND   ♦                                                                                                                    0221832
    1   QU  W OULD YOU LIKE TO KNOW YUUR SCORE /    T YPE YES OR NO. ♦                                                          0221903
    2   CA YES♦                                                                                                                 0221914
    3   BR SCRTID    //-4///C1♦                                                                                                0221978
    4   BR SCRTIC    //-5///C1♦                                                                                                0222037
    5   BR SCRTIB    //-6///C1♦
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    6   BR SCRT1A    //-7//C1↓                                                    0222096
    7   CA NO↓                                                                   0222155
    8   TY  Y OU MAY OBTAIN YOUR SCORE FROM YOUR INSTRUCTOR AT A LATER TIME. ↓   0222170
    9   NO  P LEASE DEPRESS THE EOR  9 ALTN CODING AND 5 0 . ↓                   0222249
   10   BR SEC2      ↓                                                          0222312
SCRT1A    ↓                                                                     0222363
    1   QU  Y OU RECEIVED AN  A .   L ET ↓ S GO ON TU THE NEXT SECTION.   P LEASE ↓  0222414
    2     DEPRESS THE A KEY. ↓                                                   0222498
    3   CA A↓                                                                    0222530
    4   BR SEC2      ↓                                                          0222544
    5   UN  P LEASE DEPRESS THE A KEY $  ↓                                       0222595
SCRT1B    ↓                                                                     0222638
    1   QU  Y OU RECEIVED A  B .   P ROCEED TO THE NEXT SECTION.   P LEASE ↓     0222689
    2     DEPRESS THE A KEY. ↓                                                   0222766
    3   CA A↓                                                                    0222798
    4   BR SEC2      ↓                                                          0222812
    5   UN  P LEASE DEPRESS THE A KEY $  ↓                                       0222863
SCRT1C    ↓                                                                     0222906
    1   QU  Y OU RECEIVED A  C .   P ROCEED TO THE NEXT SECTION.   P LEASE ↓     0222957
    2     DEPRESS THE A KEY. ↓                                                   0223034
    3   CA A↓                                                                    0223068
    4   BR SEC2      ↓                                                          0223080
    5   UN  P LEASE DEPRESS THE A KEY $  ↓                                       0223131
SCRT1D    ↓                                                                     0223174
    1   QU  Y OU DID NOT DO TOO WELL.   Y OUR GRADE IS A  D .   T HIS MEANS ↓    0223225
    2     YOU HAD 3 OR MORE INCORRECT ANSWERS.   L ET ↓ S SEE IF YOU CAN DO A ↓  0223363
    3     BETTER JOB ON THE NEXT SECTION.   P LEASE STRIKE THE A KEY. ↓          0223364
    4   CA A↓                                                                    0223496
    5   BR SEC2      ↓                                                          0223470
    6   UN  P LEASE STRIKE THE A KEY $  ↓                                        0223521
SEC2      ↓                                                                     0223563
    1   QU                  S ECTION 2 ↓                                         0223614
    2         W E CAN CONCLUDE FROM THE PREVIOUS SECTION ON SIMPLE DEVICES THAT AUTOMATION  ↓  0223650
    3     IS NOT A MACHINE.   R ATHER IT IS A PROCESS.   T HE CHIEF AIM OF AUTOMATION IS TO  ↓  0223756
    4     REDUCE HUMAN EFFORT AND HANDLING TO OBTAIN LESS ERROR.   T HE SECONDARY AIM IS TO  ↓  0223853
    5     INCREASE THE PROCESSING SPEED.   W E SHALL NOW ATTEMPT TO APPLY THE PRINCIPLES OF ↓  0223950
    6     AUTOMATION TO  D ATA  P ROCESSING. ↓                                   0224049
    7           D ATA PROCESSING IS THE PROCESSING OF INFORMATION.   T HE HUGE VOLUMES OF DATA  ↓  0224093
    8     THAT MUST BE HANDLED EVERY DAY BY BUSINESS, SCIENCE AND GOVERNMENT STAGGERS THE  ↓  0224193
    9     IMAGINATION.   I T IS PHYSICALLY IMPOSSIBLE TO PROCESS, CATALOGUE AND STORE ALL THE  ↓  0224288
   10     VAST QUANTITIES OF INFORMATION ACCUMULATED BY ALL SOURCES WITHOUT THE HELP OF MACHINES. ↓  0224367
   11      A UTOMATED EQUIPMENT ENABLES US TO GATHER DATA, MANIPULATE IT, DRAW CONCLUSIONS  ↓  0224488
   12     FROM IT, AND STORE IT FOR FUTURE USE.   R OUTINE HANDLING CAN BE PERFORMED AT HIGH  ↓  0224584
   13     SPEEDS, FREEING MEN AND WOMEN FOR MORE IMPORTANT TASKS.  T HESE MACHINES CAN DO MANY  ↓  0224682
   14     OF THE TASKS THAT HUMANS FIND BORING WITHOUT BECOMING BORED.   B ECAUSE OUR MACHINES  ↓  0224782
   15     DO NOT BECOME BORED OR TIRED, THEY MAKE VERY FEW MISTAKES.   M OST ERRORS THAT DO  ↓  0224862
   16     OCCUR ARE THE RESULT OF HUMAN ERROR OR MACHINE MALFUNCTION. ↓          0224979
   17           A LL INFORMATION HANDLING, OR DATA PROCESSING, GOES THROUGH A CYCLE.   F IRST, ↓  0225052
   18     THE DATA TO BE PROCESSED MUST BE ASSEMBLED.   T HEN IT MUST BE RECORDED IN A CONVENIENT ↓  0225150
   19     FORM.   N EXT, IT MUST BE MANIPULATED.   T HE RESULTS MUST BE REPORTED.   F INALLY,  ↓  0225251
   20     IT MUST BE STORED.   T HE NEXT SLIDE SHOWS THE DATA PROCESSING CYCLE IN SEQUENCE.  ↓  0225350
   21      P LEASE DEPRESS THE RESPONSE KEY.↓                                    0225447
   22  TY //SSDIC // ↓                                                          0225494
FINISH    ↓                                                                     0268859
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                                                                    0203451
                                                                    0203502
                                                                    0204630
                                                                    0205936
                                                                    0207080
                                                                    0207843
                                                                    0208774
                                                                    0210407
                                                                    0211177
                                                                    0211756
                                                                    0212360
                                                                    0213095
                                                                    0213549
                                                                    0214772
                                                                    0215547
                                                                    0215979
                                                                    0216754
                                                                    0217422
                                                                    0218416
                                                                    0218774
                                                                    0219214
                                                                    0219573
                                                                    0220502
                                                                    0220869
                                                                    0221284
                                                                    0221781
                                                                    0222343
                                                                    0222638
                                                                    0222904
                                                                    0223174
                                                                    0223563
                                                                    0268859
SYN      *
BEGIN    *
SEC1A    *
SEC1AQ1  *
SEC1AQ2  *
SEC1AQ3  *
SEC1B    *
SEC1BQ1  *
SEC1BQ2  *
SEC1B Q3 *
SEC1B C4 *
SEC1B Q5 *
SEC1C    *
SEC1C Q1 *
SEC1C Q2 *
SEC1C Q3 *
SEC1C Q4 *
SEC1C Q5 *
SEC1TEST *
TEST1Q2  *
TEST1Q3  *
TEST1Q4  *
TEST1Q5  *
TEST1Q6  *
TEST1Q7  *
TEST1END *
SCRT1A   *
SCRT1B   *
SCRT1C   *
SCRT1D   *
SEC2     *
FINISH   *
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APPENDIX II

List of Visitors

Partial list of visitors to Providence College Computer Center to view and try Computer Assisted Instruction techniques.

1. National Teachers Corps enrollee's from Rhode Island College.
2. Reporter from the Providence Journal/Bulletin.
3. Reporter and Photographer from the Pawtucket Times.
4. Representatives from Harvard University Bio-Medical Department, Dr. Lawrence Stolurow: department head.
5. Providence School Superintendent; Dr. Charles O'Connor.
6. Various priests and nuns from the Providence Diocese School Department.
7. Instructors and students from Rodman Job Corps Camp at New Bedford, Mass.
8. Representatives from Entelek Incorporated of Newburyport, Mass.
9. Mrs. Patricia Duffy, Vocational Education Coordinator Pemberton Township School District, Pemberton, New Jersey.
10. Dr. Sidney High, United States Office of Education.
11. Mr. Kenneth Mellor, Manpower Development Project Supervisor, Rhode Island Department of Education.
12. Dr. Finger, Rhode Island College.
13. Representatives from various departments of Brown University.

APPENDIX III

Reprint "Pawtucket Times", August, 1966

This 'Teacher' Takes Nobody's Back Talk

The pupil hesitates, glances around, fiddles with a shirt button, and makes a guess. It's wrong.

"Sorry about that. Let's make one further attempt at the correct answer," the "instructor" says.

Surrounded by concrete block walls and electronic gadgetry, the pupil stares at the "teacher." An oversized electric typewriter. "Sorry, wrong again," the thing chatters. "The correct answer is. . ."

Hardly fantasy, this scene actually took place recently in the computer center of Providence College. There, four men are among a group programming an IBM 1401 computer to be a teaching machine.

"Why, this thing could eliminate teachers!" the pupil exclaimed. Commenting later Robert Reynolds, of Providence, a teacher at Tolman, smilingly disagrees. "It will definitely serve to supplement teachers and may be the best advantage, though."

Mr. Reynolds is chairman of the coordinating committee charged with writing courses in various subjects for the computer to teach. Others in the committee are Edward P. Sherlock of 22 Miles Ave., Pawtucket, and George J. Grant of 120 Dexter St., Cumberland, both from Pawtucket Vocational High School, and Chase E. Loomis, 161 Balch St., Pawtucket, who teaches at Barrington High.

Their project, which is one of 14 in the nation underwritten by the U.S. Department of Education, is aimed at students on the high school level. Mr. Reynolds has written a program on introductory data processing, and Mr. Sherlock on introductory electrical studies.

The typical instruction program goes something like this: The pupil is asked to identify himself through code words which he types out on a "terminal"; in this case, the oversized typewriter. On the same typewriter, the computor explains the purpose of the particular course, and then proceeds to present information and ask questions.

The thing that brings the project many steps beyond being a mere electronic textbook is that it treats the pupil as an individual. "I have written one program that takes 22 pages," Mr. Reynolds said. "An outstanding student could finish it in 10 minutes. A slower student could spend hours."

"The student sets his own pace, and is not handicapped if that pace is different from the rest of the class" the Tolman teacher said.

There are several reasons why these machines will never replace teachers — the main one being that nothing will ever replace the desire to please a human, flesh and blood professor.

But his computer substitute holds out a seemingly unlimited number of uses for the future.

Schools as we know them could be eliminated, the computer specialist theorizes. Instead of spending millions to house pupils in school buildings, their education could be brought to them by installing the terminals of such a computer in a student's home.

The possibilities seem only to be limited by man's imagination.

COMPUTOR programmer Edward Sherlock, seated, sets as pupil to test electronic "brain" that he and, from left, George Grant, Robert Reynolds and Chase Loomis are programming to become a mechanical "teacher."

APPENDIX IV

Time Utilization Table

TIME UTILIZATION TABLE

Activity	Hrs. Wkly.	Period	Total Hrs.
Formal Instruction	2	1 hr.	12
Role of Proctor	2	1 hr.	12
Use of 1050	2	1 hr.	12
Discussion	2	1 hr.	12
Entry and Testing	2	2 hrs.	24
Participant Preparation	15*	--*	90*
	25		162

* No actual time record was kept by participants. However, several participants estimated their own time at 15 hours of work outside committed or allotted time.

APPENDIX V

Participants and Course Title

PARTICIPANTS AND COURSE TITLES

PARTICIPANTS	COURSE TITLES
Robert G. Brooks	Business Law Vocabulary
Joseph DeFusco	Survey in General Insurance
Joseph A. Depasquale	Introduction to Transistors
Edward A. DeSanto	Basic Electric Arc Welding
George J. Grant	Special Factors in Math
Chace E. Loomis, Jr.	Automobile Insurance
Arthur Montanaro	Filing
Amato Nocera	General Mathematics
Robert R. Reynolds	Introduction to Data Processing
Edward P. Sherlock	Basic Electrical Theory
Allen F. Swann	Basic Data Processing
Raynond Szeflinski	Postal Services
Frank R. Walker, III	English Grammar

APPENDIX VI

Communities and Schools Represented

COMMUNITIES AND SCHOOLS REPRESENTED

HIGH SCHOOLS	COMMUNITIES	STUDENTS
Barrington High School	Barrington, R. I.	1
Coventry High School	Coventry, R. I.	2
Cranston High School	Cranston, R. I.	1
Pilgrim High School	Warwick, R. I.	2
Tolman High School	Pawtucket, R. I.	1
Warren High School	Warren, R. I.	1

VOCATIONAL SCHOOLS	COMMUNITIES	STUDENTS
Pawtucket Vocational High School	Pawtucket, R. I.	2
Vocational Tech. School of Rhode Island	Providence, R. I.	3

APPENDIX VII

Basic Computer Assisted Instruction System

BASIC COMPUTER ASSISTED INSTRUCTION SYSTEM

1. Software: Basic IBM Coursewriter Programming Language*

2. Hardware:

QUANTITY	ITEM
1	1401 Central Processing Unit
1	1402 Card Reader-Punch
1	1403 Line Printer
1	1409 Model 2
2	1026 Transmission Control Unit
2**	1050 Data Communications System

* As adapted by the University of Texas to allow batch-loading of punch cards.

**One 1050 Data Communications System has been modified to utilize a slide projector and a tape recorder. This unit serves as the master terminal.

APPENDIX VIII

Report of Technical Difficulties

DIFFICULTIES ENCOUNTERED WHILE OPERATING COURSEWRITER

I) -Loss of continuity of course material
-Loss of course material
-Branching to improper course material

All three problems can be linked to the same weakness of the original CAI system. In order to explain the problem involved it is necessary to consider in some detail the medium of storage employed by the CAI system. This medium is a relatively high-speed external storage device called a disk. Since disk storage is not basically a sequential storage medium, some means of identifying the location of the desired material on the disk must be available. The physical location of a record on a disk lies within a sector of the disk; each sector having a unique address.
Therefore, if course material is to be stored on a disk and a course is to maintain a logical continuity, it is necessary to obtain from the course record presently being processed by the CPU, the physical location of the next logical record; not necessarily sequentially stored. This portion of the record is called a pointer, since it literally points to the physical location (address) of the next logical record of the course. If an author should desire to insert some material in his course, the CAI system would physically position this material at the end of the course.
To maintain the logical continuity, it would be necessary to

a. Break the chain of pointers at the logical point of insertion
b. Cause the pointer in the record preceding the insertion to point to the first record of the inserted material, and
c. Cause the pointer of the last record of the inserted material to point back to the record that should follow logically; i.e. a so-called "link-up" and "link-back" would have to be established.

If at any time during this process of insertion, the CAI system should be interrupted, either by a hardware malfunction, a software failure, or just plain author error the "link-back" address would be lost and data of an indeterminate nature would be inserted in the "link-back" pointer of the last record inserted. The inserted course material still would be available to the user however, the course would lose its logical continuity after reaching the end of the insertion since no connection had been established to the next logical record. This condition would invariably lead to an interrupt condition, causing the breakdown of the system and possibly the destruction of valuable course material.
In conjunction with this problem, the physical location of some special function keys on the IBM 1050 keyboard has shown to be the principle reason for author error. The manufacturer has been informed concerning this.

II) -Inability of the advanced version of Coursewriter to address the IBM 1050 terminals present at Providence College.

During the course of this contract, we obtained from the University of Texas an improved version of Coursewriter. The original version, as supplied by IBM, under an inflexible system of console addressing, restricted the modes of console operations. For example, the proctor (supervisor of the system) could exercise his functions only from the first console of the system, virtually chaining him to that device and also removing one terminal from classroom usage, since this terminal had to be placed in the immediate vicinity of the computer itself.
The CAI system obtained from Texas U. permitted the proctor to control the system from any console, thus releasing one further terminal for student and author usage. To make use of this flexibility, the terminal addresses; i.e. the codes by means of which the CPU gains access to a terminal were changed. Since we had insufficient documentation on the Texas system, the lack of any response from the terminals was first attributed to a software malfunction. After extensive debugging and consultations with personnel from the local IBM Branch Office and experts from the Advanced Maintenance and Development Department of the IBM FE Division in Poughkeepsie, N. Y., it was determined that the terminal addresses employed by the original version of Coursewriter were sufficiently different from the codes used by the Texas system to prevent any response at all from the terminals.
Once this fact had been established, a relatively simple change in the wiring of the IBM 1050 terminals involved remedied the situation.
No difficulties have since been experienced in this particular part of the CAI system.